Overview of Retroreflective Materials
Guidelines for the use of different materials in different traffic sign types

Technical illustrations of the basic composition of different retroreflective sheeting

Design C
Prismatic Air-backed Construction

Design C
Prismatic Metalised Construction

Design A
Embedded Glass Bead Construction

Design B
Encapsulated Glass Bead Construction

Photometric Performance Classes for Traffic Signs

RA1, Design A & C
Retroreflective materials of the standard performance grade used for traffic signs, are available in designs A and C. Glass bead based materials have been successfully used for traffic signs for many years, and they are used in particular for traffic signs in slow moving traffic zones, e.g. no-parking signs or short-term parking signs. They are also used for tourist information signs, street signs and advertising signs. Design A materials are not rotation sensitive.

RA1, Design A
ORALITE® 5510
Engineer Grade

ORALITE® 6710
Engineer Prismatic Grade

ORALITE® 5710
Engineer Grade Premium

RA2, Design B & C
Class RA2 is achieved with retroreflective sheeting of design B or C. In general, the RA2 grade offers higher retroreflective values for improved long distance visibility at night. RA2 materials are now an established standard for traffic signs. They are mainly used for applications such as stop signs and speed restriction signs. Design B materials have especially good reflective properties at large entrance angles; e.g. at roundabouts.

RA2, Design B
ORALITE® 5810
High Intensity Grade

RA2, Design B & C

RA2, Design C
ORALITE® 5910
High Intensity Prismatic Grade

RA3, Design C
Reflective sheeting of performance class RA3 are only available as prismatic materials in design C. They provide the highest reflective performance values. These materials are used for traffic signs in areas where a particularly high degree of reflectivity is required. They are mainly used for long distance guidance signs e.g. on motorways and in brightly illuminated environments.

ORALITE® 6910
Brilliant Grade

The requirements for which material class to use for which sign type, differs slightly from country to country. The below guidelines are from Germany, and in our experience these are quite representative for Europe as a whole.

<table>
<thead>
<tr>
<th>Signs according to section 39 to 43 of the German Road Traffic Act</th>
<th>normal environment</th>
<th>brightly lit environment and/or many external light sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>all signs other than those listed below*</td>
<td>Installation location: right</td>
<td>RA2, RA1/RA2, RA2 RA2, RA2/RA3, RA2, RA3/RA3 RA3/RA3</td>
</tr>
<tr>
<td>Installation location: high/traff</td>
<td>RA2, RA2, RA2 RA2, RA2/RA3, RA2, RA3/RA3 RA3/RA3</td>
<td></td>
</tr>
<tr>
<td>Waiting and stop signs at railway crossings</td>
<td>RAc RA2/RA3 RA2/RA3 - RA3 RA3</td>
<td></td>
</tr>
<tr>
<td>Waiting and stop signs at intersections, junctions and road narrows signs; signs for the specified direction of travel and passing of vehicles</td>
<td>RA2/RA3 RA2 RA2/RA3 RA3 RA3 RA3 RA3/RA3</td>
<td></td>
</tr>
<tr>
<td>Construction signs</td>
<td>RA2 RA2 RA2 RA2/RA3 RA2/RA3 RA2 RA2</td>
<td></td>
</tr>
<tr>
<td>Special routes, no stopping and parking, tourist information signs</td>
<td>RA1</td>
<td></td>
</tr>
</tbody>
</table>

Explanations for table 1:
RA1: Retroreflection grade 1 (previously “type 1”)
RA2: Retroreflection grade 2 (previously “type 2”)
RA3: Retroreflection grade 3 (previously “type 3”)
be: Illuminated from inside or outside
/> Selection according to boundary condition
left: If the sign is only located on the left, a higher-value performance class is recommended compared to installation location on the right

The extract from the FGSV [Road and Transportation Research Association] regulations “Information sheet for the choice of photometric performance class of vertical traffic signs and traffic infrastructure, MLV Edition 2011”, is reproduced in part with the permission of the FGSV. The applicable edition of the FGSV regulations is the most recent edition, which is available from FGSV Verlag, Wesselinger Str. 17, 50999 Cologne, www.fgsv-verlag.de.

For further information go to www.orafol.de or send an email to reflective.solutions@orafol.de. (05/2019)